

FLORISTIC COMPOSITION AND SEASONAL PATTERN OF VEGETATION OF PINE FORESTS OF SHILLONG IN MEGHALAYA¹

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(With a text-figure)

INTRODUCTION

Assam, one of the richest and interesting 'Botanical Provinces' of India is still botanically incompletely known. This is more so with Khasi hills in Meghalaya which is predominantly occupied by pine forests. These pine forests shelter a host of other species. The ecology and phytosociological aspects of these are little known. Even the floristic composition of these forests remains unknown.

The only regional account of the flora is that of Kanjilal *et al.* (1934-40) which is incomplete and has a strong bias towards the woody forest species. Though collections have been made since the time of Hooker (1872-97), a consolidated flora of this region is lacking.

A series of studies on the flora of Shillong have been undertaken by the North-Eastern Hill University at Shillong and the present account deals with the floristic composition of pine forests of Shillong in Meghalaya.

Location and soil:

Shillong is situated at 25°34'N, 91°56'E. Physiographically the entire area is hilly with a luxuriant growth of pine forests (*Pinus kesiya*). The altitude varies from 1250 to 1960 m.

The soil is fertile, loamy and dark-brown. In many places it is acidic with pH ranging from 6.1 to 6.9.

Climate and Rainfall:

Shillong has a cool climate. As it is evident from the graph³ (Fig. 1), winter temperatures go down to 5.2°C in the month of January and maximum temperature is observed in the month of April at about 25.5°C.

Rainfall is spread over all the months except December. The average total rainfall recorded for the period between 1972-74 is 219.86 cm.

During December-January frost occurs on some days in the early mornings and this kills almost all the herbaceous vegetation, leaving the ground bare and covered with a mat of pine needles.

Previous work and present approach:

The area under study is floristically incompletely known, though systematic collections have been made ever since the time of Hooker (1872-97). The only flora which covers this part is that of Kanjilal *et al.* (1934-40), which is more a forest flora. Besides, except for Poaceae by Bor (1940) the monocot part is not treated. Mitra (1958) has given an account of the monocotyledonous plants of NE. region.

Though this area has received much attention, after the establishment of the regional

³ Meteorological data for the year 1975. Thanks are due to the Meteorologist-in-charge, Khasi hills, Shillong for the meteorological information.

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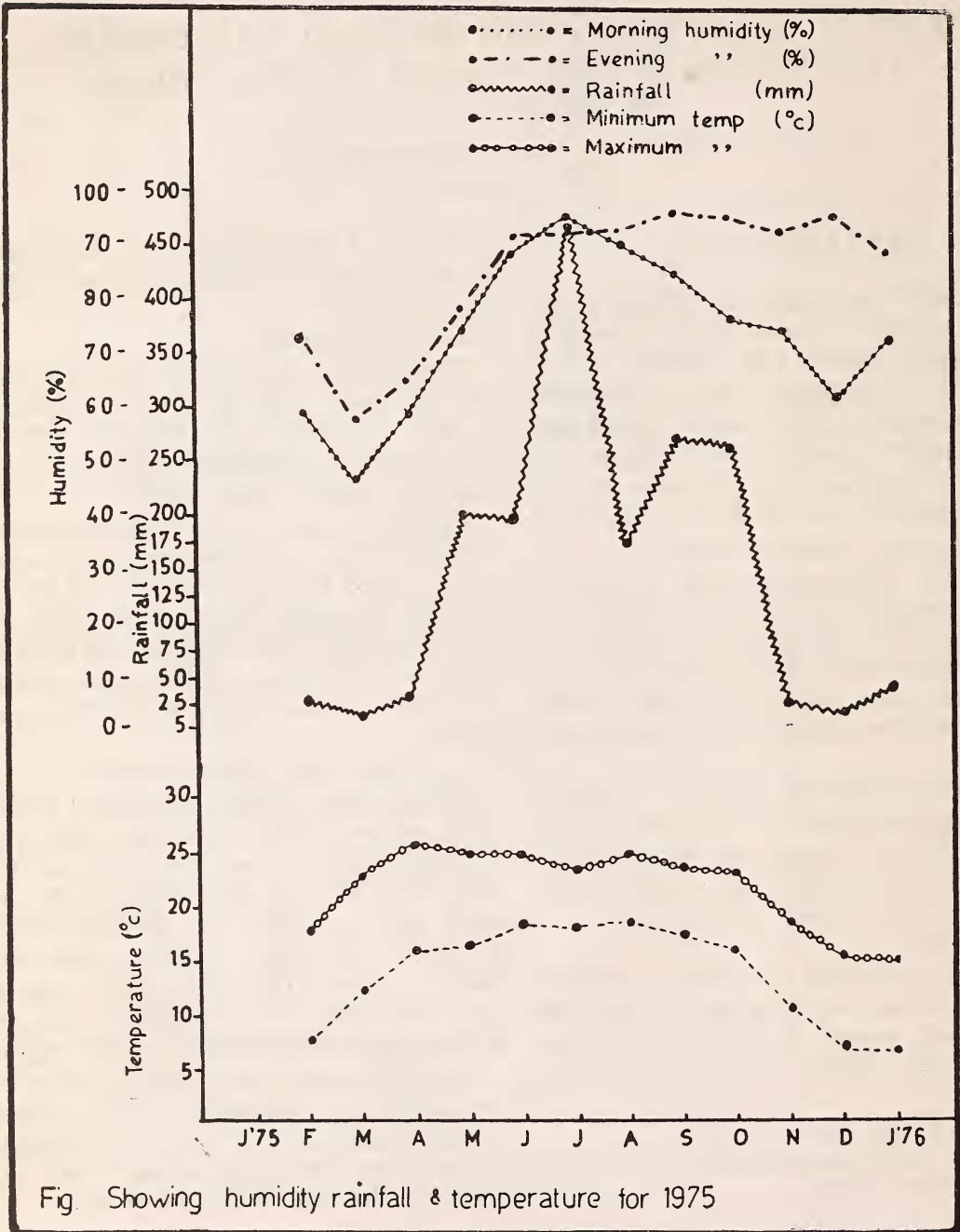


Fig. Showing humidity rainfall & temperature for 1975

Fig. 1.

FLORISTIC COMPOSITION OF PINE FORESTS

circle of the Botanical Survey of India at Shillong, a consolidated flora of Shillong is still lacking. Except for few publications on the flora of Shillong proper not much is known (Rao & Deka 1970; Rao & Rao 1976). Some significant contributions on the flora of NE. region have been made by various officers of the Botanical Survey of India at Shillong. These include Shillong also (Naik 1964; Rao & Verma 1969; 1970; 1972). The flora of the pine forests, however, remained unexplored.

The present account is based on the collections and study made by us during 1975-77. Plants have been collected from different pine forests in and around Shillong. Care was taken to collect minute herbs and other ephemeral plants. Abundant field notes were made at the time of collection with special reference to their habitats and associates. Normal herbarium procedures were followed in pressing, poisoning and mounting the specimens.

All the collections are deposited in the Herbarium of North-Eastern Hill University, Shillong (*NEHU).

FLORISTIC COMPOSITION AND SEASONAL PATTERN OF VEGETATION

Predominantly the forests are of *Pinus kesiya* with trees like *Schima khasiana*, *Quercus* sp., *Myrica esculenta*, *Acacia mollissima*, *Alnus nepalensis* interspersed. The shading by the tree canopy keeps the area moist and offers a suitable habitat for a number of herbaceous species. These cover the ground throughout the year except between November-February the coldest months in Shillong when all the herbaceous vegetation dies. Only the introduced

Eupatorium, *E. odoratum*, *E. riparium* and *E. adenophorum* manage to flourish and resist the severe cold season. *Eupatorium adenophorum* forms the dominant herbaceous vegetation in all pine forests at higher elevations.

Moderately shaded areas support grass-legume association which are subject to grazing and scrapping in some places. The common leguminous species are *Trifolium repens*, *Desmodium heterocarpon*, *Crotalaria ferruginea*, and *Smithia blanda*. The other common species which are predominant during monsoon are *Artemisia nilagirica*, *Lantana camara* var. *aculeata*, *Plectranthus coetsa*, *Osbeckia crinita*, *Hypochaeris radicata*, *Galinsoga parviflora*, *Cardamine hirsuta*, *Eragrostis nigra*, *Sporobolus fertilis*, *Polygonum punctatum* and *Centella asiatica*. *Aeginitia indica*, a member of Orobanchaceae is common in some forests among pine litters during August-October.

The severe cold of November-January checks and kills the growth of these herbaceous species, and only the hardier species like *Lantana camara* and *Eupatorium* manage to survive. In early March, *Eupatorium adenophorum* and *E. riparium* produce profusely their white flowers and form a conspicuous feature of the vegetation.

Though forest fires are not common in these forests, less densely wooded areas covered with grasses often readily catch fire and this again kills all the herbaceous species, and young shoots of the perennial species.

In marshy areas and along the ravines hydrophytes and marsh plants like *Eriocaulon brownianum*, *Lindernia cordifolia*, *Rotala rotundifolia*, *Lobelia colorata*, *Smithia blanda*, *Polygonum capitatum* and *Impatiens chinensis* and many sedges are very common. *Brugmansia suaveolens* with large, pendent, white flowers forms a striking feature of vegetation all along the streams in Shillong.

* The abbreviation NEHU is yet to find a place in *Index Herbariorum*.

ENUMERATION OF THE SPECIES OF
PINE FORESTS

In the following enumeration, the families, genera and species under each family are alphabetically arranged. Common synonyms are given in brackets immediately after the valid names. Vernacular names (Khasi names) are given where available; followed by brief notes on each taxon and its common associates. Flowering and fruiting period is also shown and this refers to our collections studied.

Species not mentioned by Kanjilal *et al.* (1934-40) are indicated by an asterisk. This does not refer to monocots except for Poaceae.

ACANTHACEAE

Hypoestes triflora R. & S.

Herb in shady places, associated with *Eupatorium adenophorum* and *Galium rotundifolium*; sparse. Fls. Sept.-Oct. *Kharkongor* 582.

Strobilanthes coloratus Anders.

Undershrub in moist shady places; not common. Fls. Sept.-Oct. *Schizie* 474.

AMARANTHACEAE

Achyranthes aspera L. vern. 'Soh byrthied'.

Herb in partially shaded areas, associated with *Drymaria cordata*; rare. Fls. June-Oct. *Rao* 321 A.

APIACEAE (Umbelliferae)

Centella asiatica (L.) Urb.

(*Hydrocotyle asiatica* L.)

Prostrate herb rooting at nodes; common in marshy places. Fls. June-Oct. *Kharkongor* 828.

ARACEAE

Arisaema tortuosum (Wall.) Schott.

Tall herb among grasses in open places; rare. Fls. Sept. *Kharkongor* 548.

ASTERACEAE

Ageratum conyzoides L.

Herb with violet heads, common on grassy areas, associated with *Drymaria cordata* and *Mimosa pudica*; sparse. Fls. Major part of the year. *Kharkongor* 701.

* **Ainsliaea latifolia** (D. Don) Sch.-Bip.

(*A. pteropoda* DC.)

Slender herb common among grasses in open places. Fls. Nov. *Kharkongor* 762.

* **Anaphalis adnata** DC.

Fluffy herb common in grassy areas, associated with *Eupatorium* and the next species; common. Fls. Oct.-Nov. *Kharkongor* 531.

* **Anaphalis contorta** (D. Don) Hk. f.

Herbs commonly found in shady, gravelly soils, associated with *Desmodium* spp. and *Centella asiatica*; common. Fls. Sept.-Oct. *Kharkongor* 542.

* **Anaphalis griffithi** Hk. f.

Like the previous and often associated with it; common. Fls. Sept.-Nov. *Schizie* 2008.

Artemisia nilagirica (Cl.) Pamp.

(*A. vulgaris* auct. non L.)

Tall, aromatic herb growing at higher elevations and associated with *Eupatorium* sp. and *Bidens biternata*; very common. Fls. Oct. *Kharkongor* 570 A.

* **Bidens biternata** (Lour.) Merr. & Sherff.

(*B. pilosa* auct. non L.)

Tall erect herb common at higher elevations, often associated with *Artemisia nilagirica* and *Eupatorium adenophorum*; very common. Fls. Octo.-Nov. *Kharkongor* 388.

* **Chrysanthemum coronifolium** Vill.

Tall slender herb very common in open grassy areas, probably an escape from cultivation. Fls. Sept.-Oct. *Kharkongor* 533.

* **Cosmos bipinnatus** Cav.

Tall, slender herb met with in open places, associated with grasses. An escape from cultivation. Fls. Oct.-Nov. *Kharkongor* 570.

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Crossocephalum crepidioides (Benth.) S.

Moore

Erect herb in open places having a preference for moist shady location; heads reddish; associated with grasses. Fls. Oct.-Nov. *Kharkongor* 591.

Emilia sonchifolia (L.) DC.

Slender herb on open sandy soils; leaves both radical and cauline; common. Fls. Sept.-Oct. *Kharkongor* 553.

* **Erigeron canadensis** L.

Erect herb common on margins of forests, among grasses. Fls. Sept.-Nov. *Kharkongor* 550.

* **Erigeron mucronatus** DC.

Decumbent herb, very variable in leaves and colour of heads; common among grasses and on walls, associated with *Drymaria cordata*, *Polygonum punctatum* and *Oxalis corniculata*; Fls. Feb.-Mar. *Kharkongor* 532.

* **Eupatorium adenophorum** Spreng.

(*E. glandulosum* H.B. & K.)

The commonest adventive weed found abundantly in all forests, associated with other *Eupatorium* spp.; heads white. Fls. March-April. *Kharkongor* 718.

Eupatorium riparium Regel.

Like the previous species and very commonly associated with it. Fls. Feb.-Mar. *Kharkongor* 716.

Eupatorium odoratum L.

Another adventive very common at lower elevations. Fls. Dec.-Feb. *Rao* 326.

Galinsoga parviflora Cav.

Erect glabrous herb; ray florets white; common in open places. Fls. Sept.-Nov.; April-Sept. *Kharkongor* 527.

* **Galinsoga ciliata** (Rafn.) Blake

Like the previous species and associated with it; differs in hairy nature of the plant; common. Fls. Sept.-Nov. *Rao* 527 A.

* **Gerbera maxima** (D. Don) Beauv.

(*G. macrophylla* Benth.)

Herbs of shady places; associated with grasses and *Eupatorium*. Fls. Dec. *Kharkongor* 707.

Gnaphalium luteo-album L.

Woolly herb in marshy places among grass and *Centella asiatica*, occasional. Fls. Oct.-Feb. *Kharkongor* 715.

* **Hypochoeris radicata** L.

Slender herb with bright yellow heads; leaves basal only; common on open grassy soils. Fls. Sept.-Oct. *Kharkongor* 525.

Inula cappa DC.

Stout, woolly herbs to undershrub, common on open grassy soils. Fls. Oct.-Nov. *Kharkongor* 580.

Sonchus oleraceus L.

Herb with yellow heads; common outside the pine forests and near human habitations; Fls. Major part of the year. *Rao* 360.

Sonchus wightianus DC. subsp. **wightianus** Boulos

(*S. arvensis* L.)

Erect herb with glandular hairy stems and heads; common in open and shady places, associated with grasses. Fls. Mar.-July. *Rao* 361.

Tagetes patula L.

Probably an escape from cultivation; common on the outskirts of the pine forests in grassy areas. Fls. Oct.-Nov. *Kharkongor* 590.

* **Vernonia saligna** DC.

Undershrub, common in shade, associated with *Eupatorium adenophorum* and *Rubus micropetalus*. Fls. Nov.-Feb. *Schizie* 2018.

Xanthium strumarium L.

Hairy herb to undershrub, not common; Fls. Nov. *Rao* 177.

BALSAMINACEAE

* **Impatiens benthamii** V. Steen.

Slender herb in moist and shady places, associated with *Anaphalis* sp. Occasional. Fls. Aug.-Sept. *Schizie* 461.

* **Impatiens chinensis** L.

Glabrous slender herb in similar localities as the above; associated with *Eriocaulon* spp. and grasses, frequent. Fls. Aug. *Kharkongor* 503.

BETULACEAE

Alnus nepalensis D. Don

Large deciduous trees; occasional among pine trees. Fls. Oct.-Dec.

BORAGINACEAE

* **Cynoglossum lanceolatum** Forsk.

Tall, hispid herb in shady places, associated with grasses. Fls. Sept. *Kharkongor* 556.

BRASSICACEAE (Cruciferae)

Cardamine hirsuta L.

Suberect herb, glabrous; common in partially shaded areas, associated with *Polygonum punctatum*. Fls. Feb. *Kharkongor* 561, 714.

* **Nasturtium montanum** Wall.

Slender herb in shade, associated with *Centella asiatica* and *Hypochaeris radicata*; sparse. Fls. Oct. *Kharkongor* 577.

CAESALPINIACEAE

Cassia mimosoides L.

Diffuse herb on shaded grassy areas; flowers light yellow; sparse. Fls. Sept.-Oct. *Kharkongor* 540.

CARYOPHYLLACEAE

* **Drymaria cordata** Willd.

Slender herb common in marshy places, associated with *Galinsoga* spp. and grasses. Fls. Sept.-Nov. *Kharkongor* 522; *Thanchuma* 608.

COMMELINACEAE

Commelina paludosa Bl.

(*C. obliqua* Ham.)

Slender herb found in moist, grassy soils

along the ravines; Fls. Sept. *Kharkongor* 538.

Cyanotis vaga (Lour.) Schult.

Slender glabrous herb in moist places, associated with grasses and sedges. Fls. Sept.-Oct. *Kharkongor* 507, 517.

CONVOLVULACEAE

Ipomoea nil (L.) Roth

(*I. hederaceae* auct. non Jacq.)

Climber on bushes and small trees; occasional. Fls. Oct.-Nov. *Kharkongor* 706.

CUSCUTACEAE

Cuscuta reflexa Roxb. vern. Jerini-uthri.

Leafless, twining parasite, common on *Duranta*, *Eupatorium* and *Cestrum*. Fls. Oct.-Nov. *Kharkongor* 592.

CYPERACEAE

Carex baccans Nees

Tall sedge on grassy areas, sparsely distributed in some pine forests. Fls. Sept.-Oct. *Kharkongor* 523.

Carex spiculata Boott.

Like the previous species and in similar localities; Fls. Aug.-Sept. *Myrthong* 1048.

Cyperus rotundus L.

Erect tufted herb, common in open places at the margin of forests. Fls. Aug.-Sept. *Kharkongor* 520.

Cyperus sesquiflorus Matt. f. et Kukanth

Erect tufted sedge in grassy places in shade. Fls. Sept.-Nov. *Kharkongor* 512.

Cyperus zollingeri Steud.

Common at lower elevations, like the previous species. Fls. Sept.-Oct. *Kharkongor* 510.

Fimbristylis tenera Schult.

Slender herb, common in open, moist areas, associated with grasses and other sedges. Fls. Aug.-Oct. *Myrthong* 1040.

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ERIOCAULACEAE

Eriocaulon brownianum Mart.

Slender herb of marshy places; flowers in dense globose heads at the terminal ends of culms; associated with grasses and sedges and *Plantago* sp. Fls. Aug.-Sept. *Kharkongor* 501.

EUPHORBIACEAE

Phyllanthus urinaria L.

Erect herb in marshy areas; not common. Fls. Oct.-Nov. *Schizie* 487.

GENTIANACEAE

Gentiana quadrifida Bl.

Slender decumbent herb on open, grassy areas, associated with *Centella* and *Arthraxon*. Fls. Feb.-Mar. *Kharkongor* 712.

GERANIACEAE

* **Geranium nepalense** Sweet

Small herb in open grassy areas; common. Fls. Oct.-Nov. *Kharkongor* 600.

HYPERICACEAE

Hypericum napaulense Chois.

Herb of marshy places; occasional. Fls. Oct.-Nov. *Kharkongor* 493.

JUGLANDACEAE

Engelhardtia spicata Bl. vern. Dieng-lyba

Small tree; racemes pendent; fruits winged; common. Fls. May-Sept.

LAMIACEAE (Labiatae)

* **Ajuga macrosperma** Wall. ex Benth.

Short, decumbent herbs in shade; sparse. Fls. Oct.-Nov. *Kharkongor* 599.

Brunella vulgaris L.

Herb in shady places, associated with *Arundinella* spp; sparse. Fls. Aug.-Sept. *Schizie* 2006.

Clinopodium umbrosum (Bieb.) Koch
(*Calamintha umbrosa* Benth.)

Procumbent herb in grassland; sparse. Fls. Sept. *Kharkongor* 509.

Dysophylla auricularia (L.) Bl.

Coarse annual in open, moist places, associated with *Osbeckia crinita*, and *Cyanotis vaga*, sparse; Fls. Oct.-Dec. *Schizie* 494.

Elsholtzia pilosa Benth.

Erect hairy herb common among grasses; Fls. Sept.-Oct. *Kharkongor* 578, 704.

Leucas ciliata Benth.

Straggling, aromatic herb in shade; common. Fls. Sept.-Oct. *Schizie* 458.

Plectranthus coetsa Buch.-Ham.

Tall herb to undershrub in grasslands, sparse. Fls. Oct.-Nov. *Kharkongor* 574, 595.

Plectranthus striatus Benth.

(*P. hispidus* Benth.)

Herb to undershrub occasionally met with in shady places on slopes; Fls. Oct.-Nov. *Schizie* 463.

Scutellaria discolor Coleb.

Frequent, associated with the previous species. Fls. Sept.-Oct. *Kharkongor* 518.

LINACEAE

Disporum cantoniense (Lour.) Merr.

(*D. pullum* Salisb.)

Erect herb in shady places, associated with *Eupatorium* spp. Fls. Sept. *Schizie* 484.

LINACEAE

* **Reinwardtia indica** Dumont.

Stout herb with bright yellow flowers; rare. Fls. Sept.-Oct. *Kharkongor* 567.

LOBELIACEAE

* **Lobelia colorata** Wall.

Tall herb in marshes, associated with *Eriocaulon*, and sedges. Fls. Oct. *Thanchuma* 665.

* **Lobelia angulata** Forst.

Procumbent herb, associated with *Oxalis corniculata* and *Centella asiatica*. Fls. Sept.-Oct. *Kharkongor* 524, 563.

LYTHRACEAE

Rotala rotundifolia (Don) Koehne

Slender herb in marshes, associated with sedges and grasses; Fls. April *Kharkongor* 719.

MALVACEAE

Sida cordifolia L.

Herb in shady places; common at lower elevations, associated with *Eupatorium* and *Lantana*. Fls. Sept.-Oct. *Kharkongor* 516.

Urena lobata L. vern. Soh byrthit

Undershrub common at the outskirts of forests; leaves lobed, flowers pinkish; common. Fls. Sept.-Oct. *Kharkongor* 815.

MELLASTOMATAEAE

Osbeckia crinita Benth. vern. Dieng-Shokthem

Pubescent shrub, common on grassy slopes, associated with *Eupatorium* sp. Fls. Oct.-Nov. *Schizie* 462.

Osbeckia cristata

Occasional on slopes, in shady places; Fls. Oct.-Nov. *Kharkongor* 543.

* **Osbeckia glauca** Naud.

Slender herb in open places, associated with *Cyanotis vaga*; sparse. Fls. Oct.-Nov. *Kharkongor* 597.

* **Osbeckia nepalensis** Hk. f.

Undershrub to shrub in open places, asso-

ciated with *Lantana* and *Eupatorium*; frequent. Fls. Sept.-Oct. *Schizie* 482.

MIMOSACEAE

* **Acacia mollissima** Willd.

Tree with yellow flowers in globose heads; not common; Fls. Feb.-Mar. *Kharkongor* 713.

Mimosa pudica L. vern. Kombatsamthia

Procumbent herb with sensitive leaflets; common in open places; Fls. Sept. *Schizie* 488.

MORACEAE

Ficus hirta Vahl: vern. Dieng-soh-rompain
Small tree in shady places, not common; Fls. Sept. *Schizie* 478.

Ficus hispida L. vern. Dieng-lapong

Small tree, occasional in lower elevations; Fls. Sept. *Schizie* 477.

MYRICACEAE

* **Myrica esculenta** Ham. ex D. Don: vern. Soh-phi

Small tree with tubercled fruits which are eaten.

ORCHIDACEAE

Anthogonium gracile Lindl.

Slender herb in open, moist places during monsoon. *Schizie* 495.

Cymbidium macrohizon Lindl.

Terrestrial orchids, in shaded, grassy places; rare. Fls. Nov. *Kharkongor* 596.

Herminium angustifolium (Lindl.) Benth. ex Hk. f.

Slender ground orchid common during monsoon, associated with *Imperata* and other grasses. Fls. Sept.-Oct. *Kharkongor* 555.

Zeuxine strateumatica (L.) Schl.

Ground orchid common during monsoon, in open places; Fls. Oct. *Kharkongor* 572.

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OROBANCHACEAE

Aeginitia indica L.

Small, leafless parasite, in damp, shady places among the pine litter; associated with *Anaphalis adnata* and other species; frequent; Fls. Sept. *Kharkongor* 546.

OXALIDACEAE

* **Oxalis corniculata** L.

Small diffuse herb with stolon; flowers yellow and capsules bursting explosively when touched; common. Fls. Feb. *Kharkongor* 516.

PAPILIONACEAE

Clitoria mariana L.

Prostrate climber in partially shaded localities among grass; Fls. Sept.-Oct. *Schizie* 466.

* **Crotalaria albida** Roth

Tall slender herb in shade, associated with *Eupatorium* and *Bidens*; flowers yellow. Fls. Nov.-Dec. *Schizie* 2016.

Crotalaria ferruginea Grah. ex Benth.

Herb in grassy places, not common; Fls. Oct.-Nov. *Schizie* 2004.

Crotalaria occulta Grah. ex Benth.

Suffruticose herb in shade at the margin of pine forests; Fls. Sept. *Kharkongor* 547.

Desmodium concinnum DC.

Common undergrowth in pine forest at lower elevations; Fls. Oct. *Kharkongor* 544.

Desmodium heterophyllum (Willd.) DC.

Occasional in open places; Fls. Oct.-Nov. *Schizie* 454.

Desmodium microphyllum (Thunb.) DC.

Prostrate, diffuse herb in moist places; associated with grasses; common. Fls. Sept. *Kharkongor* 505.

Desmodium heterocarpum (L.) DC.

(*D. polycarpum* DC.)

Suffrutescent plants, frequently seen associated with other *Desmodium* sp. Fls. July-Sept. *Kharkongor* 579.

Desmodium pseudotriquetrum (DC.) Prain

Slender, woody plant in shady places; associated with *Lantana camara*. Fls. Aug.-Oct. *Schizie* 480.

Desmodium racemosum (Thunb.) DC. vern.

Ja-top-rit

Decumbent plants in open and shady places; Fls. Aug.-Sept. *Schizie* 479.

Desmodium sinuatum Bl.

Occasional on grassy slopes; Fls. Sept.-Oct. *Kharkongor* 569.

* **Erythrina indica** Lamk.

Tree with bright red flowers; occasional at lower elevations at the margin of pine forests. Fls. March-April.

Parochetus communis Buch.-Ham. ex Don

Slender diffuse herb in moist places among mosses; associated with *Oxalis* sp. and *Drymaria cordata*; Fls. Sept.-Oct. *Kharkongor* 568.

Pueraria lobata Willd. vern. Suting-rit

Twiner on small bushes; occasional; Fls. Sept.-Oct. *Schizie* 489.

Smithia blanda Wall. vern. Bat-shakuriao

Erect herb of marshes, associated with grasses and sedges; Fls. Aug. *Thanchuma* 602.

Smithia ciliata Royle

Like the previous species and often found in similar localities. *Kharkongor* 571.

Tephrosia tinctoria Pers.

Undershrub in partially shaded areas; common in lower elevations; Fls. Sept.-Oct. *Kharkongor* 519.

Trifolium repens L.

Small trailing herb in shady places; occasional. Fls. Feb.-Mar. *Kharkongor* 708.

PLANTAGINACEAE

Plantago major L.

Herb of moist places; frequent along the

ravines, associated with grasses. Fls. Sept.-Oct. *Kharkongor* 564.

POACEAE (GRAMINAE)

Arthraxon quartinianus (Rich.) Nash.

Common. Fls. Oct.-Nov. *Kharkongor* 594.

Arundinella bengalensis (Spreng.) Druce

Tall grass with brown spikelets, associated with *Bidens* and *Eupatorium*. Fls. Sept.-Oct. *Kharkongor* 511.

Arundinella nepalensis Trin.

Common in shade; Fls. July-Sept. *Kharkongor* 376.

Axonopus compressus (Sw.) Beauv.

Slender grass, associated with *Oxalis* sp. and other grasses. Fls. Sept. *Kharkongor* 366.

Bothriochloa pertusa (Willd.) A. Camus

Tufted grass with brownish culms; occasional. Fls. Sept.-Nov. *Kharkongor* 560.

Brachiaria villosa A. Camus

Frequent at the margin of forests; Fls. Sept.-Oct. *Kharkongor* 396.

Capillipedium assimile (Steud.) A. Camus

Tall slender grass, associated with *Eupatorium adenophorum* and *Artemisia nilagirica*. *Kharkongor* 552.

Chrysopogon aciculatus (Retz.) Trin.

Tufted grass, common in open places, associated with *Centella* and other grasses; Fls. Sept.-Oct. *Kharkongor* 390.

Cymbopogon khasianus (Hack.) Stapf ex

Bor

Tall grass with greenish red spikelets, associated with *Eupatorium* spp. common inside the forests; Fls. Nov. *Kharkongor* 705.

Eleusine indica (L.) Gaertn.

Common in marshy places during monsoon. *Kharkongor* 549.

Eragrostis nigra Nees ex Steud.

Slender grass with dark-green spikelets, as-

sociated with *Eupatorium*, common in shade; Fls. Sept.-Nov. *Kharkongor* 530.

Eragrostis uniolooides (Retz.) Nees ex Steud.

Like the previous species, but not so common; Fls. Nov. *Neogi* 2573.

Eulalia fastigata (Nees) Haines

Tall grass with brownish spikelets, associated with other grasses; common on loose soils; Fls. Nov. *Kharkongor* 703.

Imperata cylindrica (L.) Beauv.

Tall slender grass in open places; spikes white when mature; not common; Fls. Oct.-Nov. *Kharkongor* 387.

Isachne clarkei Hk. f.

Tall grass in shade and among *Lantana* bushes; occasional. Fls. Sept. *Kharkongor* 521.

Microstegium ciliatum (Trin.) A. Camus.

Common in open places; Fls. Oct.-Nov. *Kharkongor* 377.

Oplismenus burmanii (Retz.) Beauv.

Very common in moist shady places, especially in loose soils, associated with *Drymaria cordata*, and *Oxalis corniculata*. Fls. Sept.-Oct. *Kharkongor* 529.

Oplismenus compositus (L.) Beauv.

In similar localities as the above, but more common in lower elevations. *Myrthong* 1183.

Oryza meyeriana Baill.

Tall grass in shade, associated with *Eupatorium*, and *Lantana*. *Kharkongor* 373.

Panicum brevifolium Roxb.

Common in open places. Fls. Sept.-Oct. *Kharkongor* 515.

Paspalum dilatatum Poir.

Tall grass in open places, associated with other grasses and *Eupatorium* sp., occasional; Fls. Sept.-Nov. *Kharkongor* 513.

Pennisetum typhoides Stapf ex Hubb.

Procumbent herbs, associated with *Eupatorium* spp.; frequent. *Myrthong* 1124.

Poa annua L.

Small, tufted grass, very common in open

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places, associated with other grasses; Fls. July-Sept. *Kharkongor* 364.

Sacciolepis indica (L.) Chase

Common in marshes; Fls. July-Sept. *Myrthong* 1405.

Setaria glauca (L.) Beauv.

Tufted grasses, occasional in lower elevations, associated with *Plantago* and *Drymaria*; Fls. Sept.-Nov. *Kharkongor* 566.

Setaria palmifolia (Koen.) Stapf

Common in open places, associated with *Eupatorium*; leaves palm-like with prominent veins. Fls. Sept.-Nov. *Kharkongor* 528.

Sporobolus fertilis (Steud.) Clayton

(*S. indicus* auct. non L.) R. Br.

Common in open places, associated with other grasses. Fls. Sept.-Nov. *Kharkongor* 551.

Themeda villosa Dur. et Jack.

Stout grass in moist shady places, associated with *Osbeckia* sp. and *Lantana*; not common. Fls. Sept.-Oct. *Schizie* 481.

POLYGALACEAE

* **Polygala persicariaefolia** DC.

Herb, common in shady places at lower elevations. Fls. Sept.-Oct. *Schizie* 481.

POLYGONACEAE

Fagopyrum dibotrys (D. Don) Hara

Tall puberulous herb, common in moist places; Fls. Sept.-Nov. *Kharkongor* 537.

Polygonum hydropiper L.

Tall herb, lower nodes rooting; common in marshes along the ravines. Fls. July-Oct. *Neogi* 2284.

Polygonum punctatum L.

(*P. alatum* Buch.-Ham. ex Spreng.)

Slender herb with globose heads; common in marshes and in open places; Fls. Sept.-Nov. *Kharkongor* 526.

RANUNCULACEAE

* **Delphinium denudatum** Wall. ex Hk. f. & Th.

Herb with purplish-blue flowers; rare. Fls. Nov. *Kharkongor* 599.

Ranunculus diffusus DC.

Small diffuse herb in marshes, associated with *Drymaria cordata* and grasses; sparse. Fls. July-Sept. *Kharkongor* 541.

ROSACEAE

Agrimonia eupatorium L. vern. Lynniang-lynnning

Herb in shady places; sparse. Fls. Dec. *Schizie* 468.

Duchesnea indica (Ander.) Focke

(*Fragaria indica* Ander.)

Small procumbent herb with bright red fruits; Fls. & Frts. Sept. *Kharkongor* 504.

Neillia thyrsiflora D. Don vern. Torsuin

Shrub, branches drooping; occasional in shady places; Frts. Oct. *Kharkongor* 585.

Potentilla fulgens Wall. ex Lehm. vern.

Lyngiang-bru

Herb with stout rootstocks, common in partially shaded places in grassland; Fls. Sept. *Kharkongor* 565.

* **Potentilla mooniana** Wt.

(*P. polyphylla* Wall.)

Decumbent herb in shade, associated with *Cyanotis vaga* and *Eupatorium* spp., sparse; Fls. Aug.-Sept. *Schizie* 464.

Rubus ellipticus Sm. vern. Sia-soh-bru

Prickly, straggling shrubs; occasional in the shrubby stratum in pine forests; Fls. Feb.-March; *Kharkongor* 709.

Rubus micropetalus Gardner

Shrub with straggling prickly branches; common in shade; Fls. & Frts. Aug.-Nov. *Kharkongor* 393.

RUBIACEAE

Borreria articularis (L.f.) Will.

(*B. hispida* Schum.)

Procumbent herb, branches quadrangular; flowers white; very abundant in some pine forest, at lower elevation; Fls. July-Sept.

* **Borreria ocymoides** (Burm. f.) DC.

Like the previous species, but not so common; Fls. July-Sept. *Kharkongor* 554.

Galium elegans Wall.

(*G. rotundifolium* Hk. f.)

Hairy herb, branches climbing or straggling; very common among *Eupatorium* bushes; Fls. July-Sept. *Kharkongor* 506.

* **Oldenlandia corymbosa** L.

Slender herb in marshy places; not common; Fls. Sept. *Kharkongor* 539.

Rubia cordifolia L. vern. Soh-misem

Scabrid climbing herb; common on *Lantana* and *Eupatorium* in Pine forests. *Kharkongor* 506A.

SCROPHULARIACEAE

* **Lindernia anagallis** (Burm. f.) Penn.

(*L. cordifolia* Merr.)

Decumbent herb of marshy places, along the ravines, associated with grasses and sedges and *Drymaria cordata*; Fls. Sept., *Kharkongor* 514.

SOLANACEAE

Brugmansia suaveolens (Willd.) Bercht. & Presl.

Shrubs with large white, pendent flowers; common all along the ravines and streams; Fls. Major part of the year; *Mahanta* 404.

Cestrum aurantiacum Lindl.

Probably an escape from cultivation; flowers orange coloured. Fls. Oct. *Kharkongor* 568.

Nicandra physalodes (L.) Gaertn.

Large herb with blue flowers; common in waste places; Fls. July-Nov. *Schizie* 460.

Solanum myriacanthum Dun.

(*S. khasianum* Cl.)

Prickly shrub with bright yellow, globose berries, frequent in open places; Fls. Aug-Sept. *Mahanta* 413.

Solanum sisymbriifolium Lamk.

Very prickly shrub; flowers bluish; berries red when ripe; not common in pine forests; Fls. July-Sept. *Mahanta* 414.

Solanum torvum Sw. vern. Dieng-soh-nonag

Pubescent shrub with white flowers, and globose berries; not common. Fls. June-Sept. *Mahanta* 404.

SMILACACEAE

Smilax sp.

Climbing on other bushes; not observed in flowers.

SYMPLOCACEAE

Symplocos racemosa Roxb.

Small tree with globose, scarlet fruits; frequent; Fls. June-Oct.

THEACEAE

Eurya japonica Thunb.

Shrub associated with *Eupatorium* spp.

TERNSTROEMIACEAE

Schima khasiana Dyer.

Tree, occasionally found associated with pine trees; Fls. June-Aug.

TILIACEAE

Triumfetta pilosa Roth.

Hispid undershrub to shrub, flowers pinkish; *Schizie* 2015.

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URTICACEAE

Pouzolzia hirta Hassk. vern. Jamynsleh
Common in marshy places; *Schizie* 486.

VALERIANACEAE

Valeriana hardwickii Wall.
Common undergrowth in pine forests, flowers white; Fls. Sept.-Nov. *Kharkongor* 545.

VERBENACEAE

Clerodendrum serratum (L.) Moon vern.
Rilong-phlang
Undershrub to shrub, flowers white; frequent. *Kharkongor* 586.

Duranta plumieri Jacq.
Shrub, commonly found in hedges near pine forests; rarely found inside the forests; flowers blue; fruits orange when ripe; *Rao* 309.
Lantana camara L. var. **aculeata** (L.)
Moldenke vern. Soh-pang khlich
Straggling, prickly shrub, very common and

abundant in some places. Fls. major part of the year; *Kharkongor* 535.

VIOLACEAE

Viola serpens Wall. ex Benth.
Slender herb in shady places; not common; Fls. Feb.-Mar. *Kharkongor* 491.

ZINGIBERACEAE

Costus speciosus (Koenig.) Sm.
Tall, stout herb with red, cone-like spikes; occasionally found in shaded areas; Fls. Nov. *Schizie* 475.

Hedychium gardnerianum Rosc.
Tall herb in marshy places; flowers white, fragrant; common. Fls. Sept. *Schizie* 476.

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